

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Education or Training?

A CRITICISM often levelled by the scientist at the layman is that while the scientist is expected to have a good general knowledge of everyday subjects outside his own sphere, the non-scientist is to be excused for ignorance of even the most elementary facts of science and scientific history. As Dr. Kendall put it, in the introduction to the published volume of his Royal Institution Christmas Lectures, if a scientist were to speak of "Michael Shakespeare," any literary audience would dissolve in laughter; yet candidates were asked, in an examination paper of matriculation standard, what they knew of "William Faraday"!

On his side, the non-scientific layman has some grounds for the accusation that scientists are too apt to enclose themselves in small compartments of knowledge, and to profess complete lack of interest in any facts not pertaining to their own special subject. Of recent years, however, there has been a welcome tendency, among certain scientists at any rate, to take a broader view of education, and not to regard it simply as a means of increasing the student's technical aptitude.

An indication of this, perhaps especially noteworthy as it comes from America, supposedly the home of utilitarian as distinct from liberal education, is contained in the annual report of the Director of the Cooper Union, Mr. Edwin S. Burdell. The Cooper Union is an institution primarily intended for the study of engineering, including chemical engineering, and what the Director has to say concerning the education of engineers is equally applicable to chemists of all branches.

He quotes a criticism that mentions the engineer's narrow understanding of the human society in which science and technology play so important a part. Reason tells us, he says, that young men little schooled in history and in the basic principles of human behaviour, and with views on political, economic and racial matters that are compounded of personal prejudice and current propaganda, are ill fitted to step into positions of responsibility where calm judgment, understanding and broadmindedness are required. It is not to be doubted that study of the social sciences and the humanities, integrated with the study of

science proper, renders students less susceptible to the effects of political clichés and slogans, and averts the danger of stereotyped thinking—truly a tremendous danger in these days when adaptability is a condition of survival.

In the various systems that have been evolved to meet this need subsidiary dangers are apt to arise. Some teachers stress the application of languages and other humanistic subjects to the special needs of the main subject; they demand that students shall learn "chemical German," for example, or "chemical economics." Actually, however, the emphasis should be laid on the fundamental elements of the subject, not on its superficial utility. As Mr. Burdell says, a study of only one application of these subjects "is as superficial as a correspondence course in Diesel engines compared to a college course in Mechanical Engineering."

Nor, on the other hand, should the humanities be relegated to a preliminary course; a total initial immersion in non-technical subjects *may*, it is true, have a permanent effect when the chemist when he begins to practise; but how much more effective it is for an impressionable student to have his humanistic studies integrated with his technical work throughout his course, advancing in difficulty, and probably in interest, step by step alongside his chemical work! Just as the fundamental chemical impulse is the desire to know why substances behave as they do, so the relative humanistic impulse is the wish to understand why people behave as they do.

It is not too much to say that the present lamentable situation of the world is in part caused by the failure to link up education and vocational training. Technical skill is undoubtedly an essential for a chemist, as for every other scientist, but without the accompanying ability to think independently, this very skill can become an actual danger to the community, all the worse because, in the nature of the case, the individual is unconscious of the state of affairs. Nothing provides better material for the unscrupulous agitator to work on than the mind which is trained to a certain aptitude but is at the same time ignorant of fundamental causes.

CONTENTS

Education or Training?	31
Notes and Comments	32
<i>The Vicious Spiral—Fair Play for Traders— German Petrol Situation—Toxicity of Benzol.</i>	
Can Gaseous Fuel Replace Petrol?	33
New Control Orders	34
Safe Metals for the Design of Chemical Equip- ment	35
The State as Trader	36
Soap and Grease Recovery	37
Lac-Glycol Ethers	37
Chemicals in Germany	38
Coal Cleaning	38
Personal Notes	39
A Chemist's Bookshelf	40
Excess Profits Tax	40
General News from Week to Week	41
Inventions in the Chemical Industry	42
Commercial Intelligence. Stocks and Shares	43
Weekly Prices of British Chemicals	44

NOTES AND COMMENTS

The Vicious Spiral

BOTH the Prime Minister and the Chancellor of the Exchequer have been emphasising the need of sacrifices from all as an indispensable condition of bringing the war to a victorious end. The industrial and trading community has already shown conclusively that it is prepared to go to all lengths for the achievement of the supreme national purpose. It is cheerfully paying by far the highest rate of direct taxation ever levied on a free people, and is shouldering other burdens with a courage and resolution not always appreciated in official circles. The recent utterances by the two leading men in the War Cabinet, however, give a warning of sacrifices still to be demanded. Those who utter the warning must not be surprised if business men and their work-people raise some pointed questions in their turn on the financial position as they see it. There can be no dispute about the danger, which the Prime Minister strongly emphasised in his Mansion House speech, of attempting to tie wage rates to the cost of living. If every rise in price is to be met by an increase in wages leading to a further rise in price and another increase in wages to meet it, and so on *ad infinitum*, we are in for the vicious "spiral" of inflation which caused great damage in the last war and almost irreparable harm after it. Where the Government have gone wrong is in thinking, against all experience, that they could prevent prices from rising by Act of Parliament. Many of the price increases which are causing so much concern to Sir John Simon were actually caused (to quote a leading article in *The Times*) by the action of the Government control agencies which in several cases used their requisitioning powers to buy up stocks of raw material and sell them back at a much higher price.

Fair Play for Traders

THIS question of the supply of raw materials is indeed the acid test of the new bureaucratic machine. Ministers have argued over and over again that the maintenance and extension of the export trade is a form of national

service second only in importance to the military effort. British manufacturers are only too anxious to respond to this call; inquiries are most encouraging. There would, in fact, be business for the asking in great neutral markets where Germany was hitherto a competitor, if the essential raw materials could be extracted out of their precious controllers. Everywhere the same story is told of failure to obtain raw materials, more especially metals, under the new dispensation. Anyone who has seen anything of the present methods of administration knows that the new bureaucracy needs a controller far more than the average business man, who is not only a professional at his job, but has to stand or fall as a result of his year's trading. The Government can get anything out of the industrial and commercial community if it gives it fair play. The system of bureaucratic control which puts upon that community all the responsibility, while taking away its first requisite of liberty of action, will never be accepted as fair play.

German Petrol Situation

AN interesting estimation of the petrol supply situation in Germany has been made, from figures supplied by the Annals of the German Mineral Oil Industry, by M. Friedwald. He points out that at present, German production, including both artificial and natural sources, amounts to about 4 million tons. Of this figure, something under a million tons comes from natural sources, while the rest is produced by hydrogenation. Arrangements with Rumania provide an additional 1,500,000 tons, which, compared with the minimum estimated requirements, leaves a deficit of 3,250,000 tons per year. This figure, Friedwald insists, cannot possibly come from Russia, even even Russian production could supply it, since it would require the use of 25,000 tank wagons for transport by rail, and mean the daily passage of 21 petrol trains from Russia into Germany. Neither country has such quantities of rolling stock. If transported by water and the Baltic Sea, this petrol would require 600,000 tons of tanker bottoms, which also do not exist. The solution of the petrol problem of the Reich, he feels, lies rather in the development of hydrogenation, but this will have to be carried out on so vast a scale as to take many years.

Toxicity of Benzol

AN interesting study of the toxicity of benzol has been made in Paris by Pierre Angenot and Robert Charlier. Their purpose was to determine whether benzol is really as toxic as it is supposed to be, or whether the toxic effect, noted in many chemical industries, is due to impurities. They note that previous experiments seem to have been made without sufficient care in ascertaining the nature and quantity of the impurities, notably toluene and xylene. They suggest that an effective method of determining the purity of the benzol is to treat it with a mixture of nitric and sulphuric acids, in order to obtain metadinitrobenzene. This permits as little as 100 m.g. of benzol per litre to be detected and accurately measured. For smaller quantities it is preferable to use a spectroscope. Making comparative tests with chemically pure and with commercially pure benzol, Angenot and Charlier found that the latter is considerably more toxic than the former. Tests with the impurities noted in the commercial benzol indicated that the increased toxicity is not due to thiophene, which has no toxic action at all, but rather to a fraction of the benzol having a boiling point between 80.4° and 81.2° C.

CAN GASEOUS FUEL REPLACE PETROL?

The Sources and Distribution of Methane

By

HENRY T. F. RHODES, M.I.E.I.,

Joint Honorary Secretary of the Gas Traction Development Committee.

WITH petrol heavily rationed and rising in price, it is inevitable that chemists and engineers should attack the problem of substitutes. In peace time gaseous fuel attracted very little attention beyond the technical interest the subject arouses. War conditions alter the whole situation. It may happen that Britain will have need of every additional gallon of petrol she can produce. The proper utilisation of gaseous fuel may make the difference between victory and defeat.

The Gas Traction Development Committee has been formed under the chairmanship of the Rt. Hon. Lord Strabolgi to investigate the economic possibilities of the utilisation of gaseous fuels, and in particular the utilisation of methane gas. Apart from the fact that methane has great technical advantages as a fuel, the economic aspects of its development are interesting. Large quantities of the gas are being blown to waste.

Sources of Methane

Our resources of methane are not known, and this is the first problem which requires investigation. The sources are (1) Sludge gas which is evolved in the process of the digestion of sewage. (2) Natural sources. (3) The blow holes of coal mines. (4) Coke oven gas. (5) The so-called complete gasification of coal, that is to say the hydrogenation of coal under pressure.

Sludge Gas.—In regard to sludge gas, the Committee has already secured some interesting figures. Four London sewage works with digester plants produce an amount of the order of 1,800,000 cubic feet per day. About 1,200,000 cubic feet is used to drive the stationary engines of the sewage plants, so that the available surplus is in the neighbourhood of 600,000 cubic feet per day. This represents an equivalent in petrol of about 9,000 gallons per day or over 3,250,000 gallons per year, equivalent to about 0.3 per cent. of the country's peace-time needs. There exist, however, five other sewage works which have introduced digester plant, and eight others are to introduce it in the near future, which will offer a substantial increase in the quantities of methane available from this source. The total available from the combined sources will certainly exceed 1 per cent. of the requirements.

Natural Sources.—In Scotland a natural source of methane exists which would supply 10 to 12,000,000 cubic feet per day for at least three to five years. Since this gas is practically pure, the amount available would be of the order of 15,000,000 equivalent gallons of petrol per annum or 1.5 per cent. of the country's peace-time requirements.

Blow Holes of Mines.—No figures exist upon which an adequate estimate can be based; it is known, however, that blow holes emit methane with a purity of the order of 80 per cent. in quantities which vary from 10,000,000 to 1,000,000 cubic feet of gas per day. The total quantity available is probably substantial.

Coke Oven Gas from which methane can be readily separated is at present blown to waste in this country. On an average 10,000,000 cubic feet daily are available which represents about 1 per cent. of the country's requirements in peace time.

Complete Gasification of Coal.—The hydrogenation of coal represents an unlimited supply of methane gas. Various research organisations are now conducting investigations into the commercial possibilities of this process. Considerable investigation will be necessary before any statement regarding available resources can be made. It is clear, however, that they are not negligible. At least 7 per cent. of the country's

petrol requirements are probably going to waste in the form of valuable fuel. The figure may prove to be much higher, perhaps nearer 15 per cent.

Interesting figures are already available from sources where compressed methane is to be used for traction purposes in the near future. The cost of the compression of methane, including the compression itself, maintenance, and labour, is 2½d. to 3d. per gallon. Careful estimations on the basis of all charges, including capital charges, have shown that on the basis of a production of 150,000 equivalent gallons of petrol per annum and a five-year loan period, the cost of methane compressed into bottles (the bottles being included in the capital charge) would be 10d. per gallon. Since the Government has undertaken to remit duty upon gaseous fuel for at least five years, it is obvious that these costs will compare very favourably with that of petrol, even on the basis of this small-scale production.

Whilst engine conversion is not absolutely necessary for the utilisation of methane as fuel, full efficiency cannot be achieved without it. No precise figures are yet available as to the cost of engine conversion, but it is known to be something like £25. If conversion was undertaken on a large scale, this figure would probably be reduced. It is further possible so to arrange the conversion that cars can be run either on petrol or on gaseous fuel.

The efficiency of methane as a fuel is not disputed. The compression ratio of the gas is 16 : 1, whilst that of petrol is 5.5 : 1. If the octane were obtainable it would be higher than that of any known petrol. Methane is compressible, and is normally compressed into cylinders at 5,000 lb. It is an important fact that the gas does not obey the ordinary gas law, $px=k$, the decrease in volume not being proportional to the absolute pressure. This means in practice that the actual quantity of gas that can be stored in a container of given size at a given pressure is greater than if methane obeyed the gas law. At a working pressure of 3,000 lb. it has been stated that the increased quantity is as great as 20 per cent. Even if this figure is high, it gives methane a considerable advantage over coal gas, which does obey the compression law.

Methane can be liquefied at a temperature of -161°C . A form of thermos container is, of course, necessary. The question of losses by evaporation arises in this connection, and rapid transport is necessary, and a careful adjustment of supply to avoid considerable losses. Very interesting experiments are being carried out in connection with the utilisation of the liquid gas.

Other Gaseous Fuels

Whilst our inquiry, so far as it has proceeded, seems to suggest that methane has many advantages over other forms of gaseous fuel, coal gas and producer gas both have claims to attention. It is obvious that since the supply of coal gas is practically unlimited, and that producer gas can be produced in any required quantity, the problem of supply does not arise. On the other hand the claims of methane should, in our view, be investigated first by reason of the fact that a large proportion of this gas is a waste product which it would be advantageous to make use of.

The function of the Gas Traction Development Committee which was formed two months ago is not to deal with the technical aspects of the utilisation of gaseous fuels. A number of organisations already in existence are conducting research of this character, and to enter the technical field would be to duplicate work that is already being done. Further, a large number of the technical problems have already been

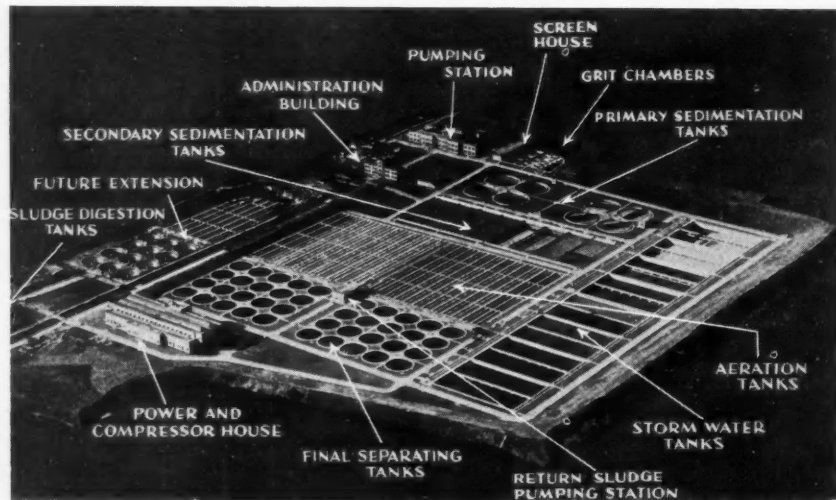
solved. In connection with methane, for example, a large sewage works near London has already arranged to instal compressor plant, and has secured containers to bottle the gas which is to be used on their vehicles. The question, therefore, of the practicability of the use of methane does not arise. No data, however, have yet become available in connection

would go a long way towards solving the problem of large-scale distribution. Other types of container of a suitable kind are made in this country. The question of their supply under existing conditions requires investigation.

The extent to which national requirements may interfere with the supply of equipment for the compression and storage

of gas need not be exaggerated. Our information is that compression plant can still be supplied within six months of the receipt of the order. Nor should any insuperable difficulty arise in connection with the delivery of other equipment. The matter is one of national importance and should rank with other nationally important work.

Without the co-operation of other bodies and of manufacturers, it is obvious that a committee of this kind cannot function efficiently. The Committee is already receiving support from a large number of engineering and other firms directly or indirectly interested in gaseous fuel or in plant and equipment which deals with it. The secretary will be glad to receive inquiries from those who are interested at the offices of the Gas Traction Development Committee, 35 Great James Street, Bedford Row,



Diagrammatic lay-out of a modern sewage purification plant, showing sludge digestion tanks for methane recovery.

with the large-scale development of the use of gas, and it is with problems of this kind that the Committee is concerned. The Committee will also collect together a large amount of information which at present only becomes available if widely different sources are examined; and it has, in fact, already collated much information not previously co-ordinated.

The economic problems of distribution, for example, are questions that require special attention. We cannot touch upon them here except in connection with the problem of containers. Lightness and strength are essential characteristics if gaseous fuel is to be utilised on a large scale. The Committee is investigating the question of the wire-wound container which is not at present being made in this country. If such a container could be produced in large quantities, it

London, W.C.1. Information concerning the operation of compressor plant, running costs, the manufacture of containers, and sources and supplies of methane are examples of the type of information sought. On the other hand the Committee naturally receives numerous inquiries and is engaged both in circulating and collecting information. The primary object of the Committee is to produce an interim report in which information concerning the utilisation of gaseous fuel and the possibilities of its development on a large scale will be considered. With the support and co-operation of interested organisations, technical and commercially productive, it believes that this report can be made a valuable contribution to a question of national importance.

New Control Orders

Control of Fertilisers

THE Control of Fertilisers (No. 3) Order, 1940, dated January 8, made by the Minister of Supply, orders that no person in the United Kingdom, from February 12, 1940, shall produce for disposal or distribute wholesale any fertiliser, except under licence granted by the Minister of Supply. Applications for licences to produce or supply fertiliser must be lodged with the Minister not less than 14 days before the date at which it is desired for the licence to take effect. Every person so licensed shall keep a register of the names and addresses of prospective purchasers of fertilisers for re-sale, and seven days' notice must be given of the intention to remove a name from or add a name to this register. Purchasers wishing their name to appear on a distribution register must apply to an authorised supplier not less than 14 days before the date on which they require their name to appear.

No person who is not an authorised producer or registered distributor shall, after February 12, 1940, dispose of or acquire any fertiliser in a quantity exceeding one ton, except to (or from) the registered person from whom he obtained that fertiliser, or under licence or special direction from the Minister of Supply.

In this Order the expression "fertiliser" means any article

(other than basic slag and oil seed fertiliser) named in the first column of Part I of the First Schedule to the Fertiliser and Feeding Stuffs Act, 1926; a producer is a person who produces fertilisers, or who mixes two or more fertilisers whether or not those fertilisers or any of them have been produced by him; and a wholesale distributor is a person who supplies fertilisers to any person whose business includes the selling of fertilisers. A person may need to be licensed both as a producer and as a wholesale distributor.

Potassium Ferrocyanide

The Treasury have issued the Additional Import Duties (No. 1) Order, 1940, which provides for the reduction of the existing duty of 2d. per lb. on potassium ferrocyanide to the general *ad valorem* rate of 10 per cent. The Order came into operation on January 12, 1940.

Last summer's crop of annatto seed is reported from Guayaquil (Ecuador) to be one of the largest on record, and about 50 metric tons above that of 1938 during which a record crop was harvested. As a result of the large crop local quotations have declined from 40 to 35 sucres per quintal of 101.4 lbs. (one sucre = 4d. approx.). About 90 per cent. of Ecuador's annatto crop is exported. Exports in 1938-39 were 139,994 kg. —85,244 kg. going to Puerto Rico, 26,380 kg. to the U.S.A., 16,220 kg. to Germany, and smaller quantities to France, Denmark and Colombia.

SAFE METALS FOR THE DESIGN OF CHEMICAL EQUIPMENT*

Some Advantages of Aluminium

OF all the metals, gold and platinum are among the most resistant to the widest range of chemicals. When the prevention of accidents is the principal concern, the selection of one of these metals would appear to offer a complete answer to the problem in so far as failure from chemical causes is concerned. Where greater strength is required than would be obtained even with a considerable thickness of one of these precious metals, it would be sufficient to specify that it shall be reinforced with a steel sheet.

It is obvious that economic considerations cannot be divorced from the treatment of this subject. The cost of an installation depends, of course, upon the materials chosen for its construction. The unit selling price of the resulting product must include the proportionate share of interest, taxes and depreciation on this initial investment. Thus, the market for the product is at once an important factor in the choice of materials. In the chemical industry the first cost of the plant may be of secondary importance in comparison with two other items, repair and maintenance, and compensation. These items of cost, together with depreciation, may be the main factors determining the choice of metals for chemical construction.

Not infrequently the governing factor in the choice is not the effect of the product on the metal, since several materials may be equally satisfactory, but rather the effect of the metal on the quality of the product. For example, the choice between two otherwise equally suitable metals may be decided by the fact that the compounds of the one are colourless or are non-toxic to yeasts or enzymes or other organic catalysts, or to the human organism. Then, too, the rate of decomposition of some chemicals, *e.g.*, hydrogen peroxide, is enormously accelerated by minute traces of certain metal salts while others have no effect whatever. Similarly hydrolysis of certain organic compounds is catalysed by compounds of some metals, a fact which must be considered in the processing of edible fats and oils.

Fortunately for the chemical industry and for industry in general, it is not necessary to resort to the extreme of specifying platinum or gold for chemical equipment. From the great number of metals and alloys now in commercial production, there is a wide choice of metallic materials with adequate resistance to corrosive attack and other properties even superior to those of the noble metals, including the essential requirement of cost.

Some Useful Alloys

Among the familiar alloys that find most general application, stainless, or more properly, corrosion-resistant steels, in which chromium and nickel are the alloying elements, combine strength and ability to be formed and welded with good resistance to the attack of the atmosphere as well as that of a number of chemicals. In fact, in the published lists of common chemicals which indicate the alloys not appreciably attacked by them, the corrosion-resistant steels are among the most frequently mentioned. High silicon iron alloys in the form of castings are also recommended for use with many chemicals which are corrosive to many of the alloys, notably inorganic acids including hydrochloric. Lead lined tanks are used extensively for sulphuric acid and for hydrofluoric acid, because of the resistance of the metal to corrosion and its economy in manufacture. Nickel and the nickel copper alloys, Monel on the high nickel side, and nickel silver which contains a preponderance of copper, have

excellent mechanical properties and can be used with a large number of chemicals, including chlorides and hydrochloric acid in moderate concentration, and with strong caustic solutions. Copper and the copper base alloys, including the brasses, bronzes, copper-silicon alloy and aluminium bronze, all find wide use in the chemical industry because of their excellent performance in a variety of applications. Where resistance to chemical attack is a requisite, one of the materials in this group is frequently of service.

Aluminium is widely used in the chemical industries. It is interesting that this metal, which resisted for so long the efforts to liberate it from its naturally occurring compound, and which is used under some conditions to enter into certain chemical reactions because of its strong reducing character, should be so nearly inert to such a range of chemicals. The answer is found in the fact that on exposure to the air or to moisture the surface becomes coated with an extremely thin continuous film of aluminium oxide which adheres to the underlying metal and protects it from further action. If this film is removed, it immediately forms again, provided oxygen and moisture are present.

Aluminium Oxide Film

As would be expected, aluminium does not withstand the action of those compounds which readily dissolve aluminium oxide, such as strong caustic solutions and some of the strong acids. However, it is used in the production of concentrated nitric acid from atmospheric nitrogen. This strongly oxidising acid, which attacks some metals so violently, builds up an oxide film on the aluminium which resists further action. The salts of certain weak acids when dissolved in water have an alkaline reaction sufficiently strong to attack aluminium. It is possible, however, to render these compounds harmless to the metal by the additions of small amounts of compounds called inhibitors. Sodium silicate or potassium bichromate may be used for that purpose. Some of these salts, such as sodium carbonate or trisodium phosphate, are commonly used as cleansing agents and water softeners. To make them suitable for use with aluminium equipment, it is necessary only to make certain that an inhibitor is present. Several manufacturers produce cleansing compounds of this type, which are used by dairies, breweries, food processing plants for cleaning aluminium equipment and by metal working plants to clean the surface of the metal before painting.

For some purposes it is desirable to have even more protection than is afforded by the film of oxide which forms spontaneously in the air. This may be accomplished by treating the metal with certain chemical solutions. Even thicker and more resistant oxide coatings are produced electrolytically. The aluminium as anode is immersed in a solution of sulphuric acid in water and a current of electricity is passed through the metal into the bath. With proper control of the process, oxide coatings are formed of sufficient thickness to be measured with sensitive micrometers. To make these coatings most resistant they are given a sealing treatment which may at the same time add an inhibitor for further protection against chemical action. However, for the great majority of the applications of aluminium in the chemical field no special treatment of the surface is required.

Aluminium salts are colourless, making it especially suited for use in the preparation of chemicals, in the textile industries, in the processing of gums and resins for colourless varnishes and lacquers, and for the processing or storing of other products graded on the basis of colour.

Careful experiments have demonstrated that aluminium

* Adapted from a paper by Dr. Paul V. Faragher, of the Aluminum Co. of America, Pittsburgh, Pa., presented to the Chemical Section of the U.S. National Safety Conference held at Atlantic City.

compounds have no harmful physiological action on the human organism. In fact aluminium hydroxide is a highly effective medicament in the treatment of gastric ulcers. Moreover, recent work has indicated that aluminium powder may be effective in preventing and treating silicosis. The wide use of the metal in the preparation and processing of foods and beverages is completely justified by these studies.

In certain of the fermentation industries aluminium is used because the products resulting from any superficial attack of the metal have no harmful action on the organisms, whether yeasts or bacteria, or on the enzymes which they produce, upon which the chemical action depends. Also certain processes, such as the decomposition of hydrogen peroxide or the hydrolysis of certain fats or oils, are not accelerated by the presence of compounds of aluminium as is the case with compounds of some of the metals.

The resistance of the metal to the action of gaseous com-

pounds of sulphur which prevail in industrial atmospheres leads to its use for processing equipment, for electrical conduits and ventilation ducts, etc. The fact that aluminium does not spark when struck or abraded is likewise important in plants where inflammable or explosive materials are handled. Finally, the ease with which aluminum can be fabricated into the equipment required by the chemical industry is another advantage.

It should be stated that in using the term aluminium, it has been intended to include the aluminium alloys which may be chosen because of their higher mechanical properties, several of these being equal to commercial aluminium in their resistance to chemical attack. For some few applications, aluminium of specially high purity is essential, but for most requirements the commercially pure metal or one of the alloys is generally used.

The State as Trader

Bulk Purchases of Raw Materials

BULK purchases of raw materials for war purposes were outlined by Colonel J. J. Llewellyn, M.P., Parliamentary Secretary, Ministry of Supply, at a conference with Press representatives on Thursday of last week. He was able to disclose the extensive contribution which the Empire is making to the raw material supplies required by the country in its war effort, and to refer to the advantageous long-term contracts entered upon by the Ministry for the purchase of essential metals and other commodities.

Answering the question whether the raw materials controls established by the Ministry of Supply were necessary, Col. Llewellyn said the controllers were appointed because it was wiser to impose control before a material became completely out of control. He contrasted the present position with what occurred during the last war when it was not until the end of 1915 that the first control was instituted. Iron and steel did not come under control until October, 1916, and as a consequence, prior to its establishment, prices soared, shortages developed, public administration was at the mercy of the market and a number of stockists withheld their stocks in order to secure higher prices for them, thereby profiteering at the expense of the country. From that experience the Government had now profited.

Government Supply Organisation

Before the outbreak of war in early September an organisation known as the Board of Trade Supply Organisation, under the Committee of Imperial Defence, was working out plans for priorities, for conserving and maintaining supplies of essential raw materials in time of war, and for diverting them to their essential uses. Too great a tribute could not be paid to the willing and wholehearted co-operation received by the Government in its efforts from the leaders of industry. The whole organisation was transferred to the Ministry of Supply in August with no break in continuity. At the outbreak of war, stocks of iron ore, to cite but one example, said Col. Llewellyn, were held in considerable quantity, while considerable stocks were held also of aluminium, zinc, antimony, mercury, ferro alloys, pyrites, sulphur, rock potash and amber mica. To achieve this state of preparation the Government had been buying quietly and without interfering with the market or with prices.

Going on to review the supply position of the Empire as a whole, Col. Llewellyn pointed out that the Empire was almost self-supporting so far as the raw materials essential to the war effort were concerned. Since the last war the copper mines of Rhodesia had been developed, aluminium production had begun in Canada, and the mining of iron

ore had been started in Sierra Leone. The following were the comparative annual Empire outputs then and now:—

	1914 (tons)	1939 (tons)
Copper ore	85,000	600,000
Lead ore	130,000	630,000
Nickel	20,000	95,000
Aluminium	13,900	88,000
Asbestos	98,000	344,000

Through the Ministry of Supply the State has now become a trader in a very large way, Col. Llewellyn continued. The Ministry was now handling directly materials to the annual value of 150 million pounds sterling. They were owners of practically all the supplies in the country of aluminium, copper and other non-ferrous metals, in addition to certain chemicals required for fertilisers. The Ministry had acquired also the whole of the exportable surplus of copper and zinc from Canada, Australia, Burma and Rhodesia. Lead requirements were being amply satisfied by supplies from Canada, Australia and Burma.

The position relating to aluminium was that the Ministry had bought the whole output of Great Britain, the whole of the exportable surplus of Canada and further large quantities from the United States of America and other countries overseas. Steps were being taken to increase the production of aluminium in this country and a representative was in Canada at the present time making arrangements similarly to expand production there. Of wolfram, which plays an important part in the manufacture of high-speed steel, the whole of the exportable surplus of the principal producers in Australia, Burma, New Zealand and certain other foreign countries had been obtained. Wolfram furnished a good example of the close co-operation being maintained with France, supplies being purchased by this country and pooled with France to prevent either country bidding against the other for it.

Summarising the raw materials position, Col. Llewellyn said that the aim of the Ministry was to see that stocks essential to the country's war effort were maintained and that such stocks were purchased at the best prices obtainable. They were determined to avoid violent fluctuations in prices and to sell materials at prices which on the one hand avoided loss to the taxpayer and on the other were fair to the consumer. Further, their aim was to ensure that their stocks were distributed in such a way as to secure their use for the needs most essential to the nation, the needs of the fighting Services, and the needs of export trade.

Soap and Grease Recovery

Use of Wool-Scouring Liquors

A NEW process for recovering soaps and greases from waste wool-scouring liquors has been devised by C. H. S. Tupholme (Ind. Eng. Chem., 1939, News Ed., 17, 24, 789). The spent liquor is mixed with finely divided chalk or milk of lime in sufficient quantity to ensure precipitation of the soaps. The liquor is then precipitated further by passing to a tank where it is treated with carbon dioxide, or CO_2 -containing gases. Precipitation can be increased by the addition of fuller's earth, bentonite, an increased pressure of CO_2 , or by the addition of carefully regulated quantities of soluble salts, such as aluminium sulphate, which facilitate the formation of insoluble soaps. The resultant precipitate is filtered out, the filter aid being a precipitate recovered from subsequent treatment with organic solvents.

The filtrate is freed from calcium bicarbonate by boiling, either at atmospheric or reduced pressure, or by blowing air through the liquor which is held at about 70°C . Another method is the addition of just enough caustic alkali to precipitate the maximum possible quantity of calcium. The liquor or filtrate is again settled or filtered, and, as it contains alkaline carbonates and small amounts of soap, it may be reused in the scouring machine, either with or without the addition of other scouring agents, or the alkalinity may be reduced with fatty acids. As the liquor, because of repeated circulation, becomes too concentrated, part of it may be employed for the recovery of potash. The remainder may be diluted with water before reuse.

Benzene Solvent Preferred

The moist precipitate from the first filtration is passed to the first extraction plant, dried or partially dried, and then boiled in an extraction vessel with a liquid solvent which is preferably almost insoluble in water and which, while dissolving lanolin and metallic soaps, forms a minimum boiling mixture with water. The solvent, on the other hand, may be boiled in the extraction vessel below the precipitate, allowing the vapour to permeate the precipitate. The solvent most favoured is benzene, as its lower boiling point permits easier recovery from the extracted grease. The benzene-water-vapour mixture is condensed and led to a separator where the water is withdrawn. The benzene is returned to the extractor. The mixture containing the grease is run off or filtered, and distilled.

The crude grease is recovered by distillation of the solvent, followed by the use of vacuum or live steam to expel the remainder of the solvent. This can also be expelled by a current of air and adsorbed by activated carbon. The exhausted precipitate can be used as a fertiliser or as a filter aid in the various filtration operations.

The grease recovered in the first extraction is separated into its two main constituents by a second process: it is treated with a mixture of 10 times its volume of mixed solvents (acetone and ethyl or methyl acetate) and then warmed above 40°C . for a few minutes. Fuller's earth or a similar coagulant may be used as a clarifier if the grease solution is cloudy. The mixture is decanted or filtered after clarification. Before purification the mixture of wool grease and metallic soaps may be neutralised with oxides or hydroxides of the alkaline earths. It may also be given a prior treatment with an aqueous mixture of a soluble calcium salt, with or without an alkaline earth hydroxide, at raised temperatures. From this the grease may be separated or extracted with benzene and the benzene recovered as already described.

The residue of impure metallic soaps, unreacted alkaline earth oxides or hydroxides, and fuller's earth is washed with further quantities of solvent. The solvent is recovered by distilling the solution containing the wool grease and also by volatilising the solvent by subjecting the recovered grease and metallic soaps to a current of warm air. The ash content of the recovered lanolin is about 0.07 per cent.

The precipitate remaining after the acetone and acetate

extraction is mostly metallic soap. It is processed further by treating with sulphuric acid, the products recovered being an alkaline earth sulphate and fatty acid. The fatty acid is saponified and returned as soap to the scouring machines. The particular alkaline sulphate recovered depends on the salt used in the first precipitation.

Lac-Glycol Ethers

Esterification and Polymerisation

ETHYLENE-GLYCOL ethers of lac have been obtained by the reaction between the hydroxyl groups present in glycol and lac. These ethers have further been esterified with acids and new and interesting compounds have been obtained. Heat polymerisation of the glycol ether of lac has resulted in elastic and flexible rubber-like compounds, which seem to possess molecular weights in the neighbourhood of 22,000. The formation and properties of these new lac derivatives appear to agree with the generally accepted theories of polymer formation.

Though further study of the physical and electrical properties of these ethers and ether esters will be necessary before definite recommendations can be made as to specific uses, the preliminary study indicates possible industrial applications. The breakdown voltage of these compounds is high; and the polymerised products resemble rubber physically. There is a considerable demand for flexible insulating materials (for cables, etc.) which can withstand the action of ozone. Further, such compounds, when fully cured, are rubber-like and at the same time insoluble in solvents and vegetable and mineral oils. It is possible to impregnate textiles and other suitable materials with them for use as packings or jointings for special purposes. The coating is non-tacky and does not require a tack-removing finishing coat. The process is simple and quicker than that of processing silk with drying oils. These treated fabrics, apart from the ordinary waterproof clothing, may be used as anti-gas and perhaps parachute fabrics; and minor uses are indicated in the formulation of paints for elastic surfaces, as a plasticiser for lac, and in leather finishes. The unpolymerised compounds may be used as special adhesives. The investigation has been carried out by B. S. Gidvani, and is described in detail in the London Shellac Research Bureau Technical Paper No. 17.

AMERICAN CHEMICALS FOR INDIA

India, one of the large chemical importing countries, recently reported that stocks of chemicals, dyes and allied products were becoming depleted and, with the uncertainties of deliveries from Europe, it is now expected that the United States will be delivering larger quantities. In the fiscal year ended March, 1938, the latest for which detailed statistics are available, imports of chemicals and allied products from the United Kingdom were valued at £4,000,000, from Germany at £3,000,000, from the U.S.A. at over £800,000. The considerable industrial development, including the establishment of some chemical plants, which has been taking place in India lately, has helped to increase the demand for imported chemicals. In the chemical field, however, one alkali plant was abandoned when about half completed, but another alkali plant came into operation in December of this year, according to recent reports. Until the outbreak of war the chances for the expansion of trade in American industrial chemicals were limited, because of the strong competition from British and German manufacturers. The same was true of fertilisers, although American brands of ammonium sulphate, ammonium phosphates, and sodium nitrate had a small sale. Nitrocellulose lacquers of United States origin also have had a good market for some time, while the demand in the local furniture industry is described as a new development.

Chemicals in Germany

Fertiliser Distribution

EFFORTS are being made in Germany to obtain the best system of fertiliser distribution with available supplies of superphosphates and nitrates. According to American consular reports the Reichsbauernführer (Reich Leader of Farmers) has a new system under preparation for the scientific distribution of fertilisers according to soil requirements. Orders were given to about 40 agricultural research laboratories to make within the next 3 years about 7,000,000 soil analyses on the lime reaction and phosphoric acid qualities of German farm soil. Inasmuch as the Old Reich alone has about 3,000,000 farms of one acre and over, several soil tests will be made on the larger farms. It will be ascertained whether lime has to be spread before fertilising, so that the available phosphates will not become biologically unavailable in very acid soils, and also to ensure that the physiologically acid nitrates are fully utilised. It will further be ascertained where a lack of phosphoric acid in the soil makes fertilisation with phosphate especially necessary so that on the basis of the "law of the minimum" the effect of fertilisation with nitrogen and potash is not hampered by a lack of phosphates.

Sulphuric Acid from Gypsum

The I. G. Farbenindustrie plant for producing sulphuric acid from gypsum at its Wolfen works has a yearly capacity of 80,000 metric tons of sulphuric acid (65,000 tons SO_3) and 75,000 metric tons of cement.

Normally Germany is heavily dependent upon foreign raw materials for its sulphuric acid, some two-thirds of the output being obtained from imported materials. About three-quarters of the acid output is normally obtained from pyrites, the remaining quarter occurring as a by-product in the smelting of ores with small amounts recovered from coal. The institution of the British naval blockade has had severe repercussions upon Germany's supply of imported pyrites by interrupting imports from Spain by sea routes, thus greatly intensifying the scarcity of sulphuric acid already existing as a result of Germany's shortage of foreign exchange for paying for imported pyrites. German production of sulphuric acid is reported to have increased from 1,066,700 metric tons in 1934 to current levels of 2,800,000 metric tons annually. The chief outlets are in the production of fertiliser materials, artificial fibres, Buna rubber, plastics, motor fuel and for military purposes.

The process now used in Germany for producing acid from gypsum was developed in 1914-18 at the Leverkusen works of the former Bayer Company, now a unit of the I. G. Farbenindustrie. Production was continued at the Leverkusen plant until 1931 when its suspension became necessary due to the conditions then obtaining. The new plant at Wolfen, according to the U.S. Consul-General at Frankfurt-on-Main, incorporates all the technical advances made by research and experience at the Leverkusen works. Raw materials for the process are coke and clay. The coke serves to reduce the sulphuric acid contained in the gypsum (calcium sulphate) so that it becomes released in gaseous form as sulphurous acid. The clay facilitates this reaction and, at the same time, converts the lime content of the gypsum to clinker which, by grinding, becomes cement of a quality corresponding to standard Portland cement. The escaping gaseous sulphurous acid is converted to SO_3 by the well-known contact process.

Candle-wax Substitute

Candles are now manufactured in Germany mainly from paraffin partly mixed with hard wax. Stearin and beeswax, formerly employed for making candles, are no longer available.

Coal Cleaning

New Loess-Suspension Process

THE cleaning of coal by means of a suspension of loess is described by Driessen (J. Inst. Fuel, 1939, 12, 67, 327-349). The method, which has been used on the large scale at three of the Dutch State coal mines, which have a supply of loess close at hand, has the advantage over all existing processes for cleaning coal with heavy liquids or suspensions, that it can be applied under static conditions, and the thickening of the suspension can be accomplished in a cyclone thickener. This is due to the fact that whereas most other materials in use for preparing coal cleaning suspensions can only be obtained at densities up to 1.2-1.3, owing to the large viscosity increase in this region, loess suspensions retain a low viscosity up to a density of 1.6.

In the process used on a 40-ton-per-hour scale at the Emma State mine, the raw coal is fed by a conveyor to a static wash box containing a loess suspension of any desired density between 1.25 and 1.65. Here the large coal is floated and removed by a specially designed scraper, which at the same time removes the clay and middlings to a separate treatment system. The large coal is washed to remove adhering loess, and the middlings are separated from the dirt by a high density suspension, if necessary, using an upward flow which, with a suspension of 1.6 density, gives the effect of one of gravity 1.8. The diluted loess suspension obtained by uniting wash liquor and used suspension is thickened in a cyclone thickener, i.e., a centrifuge, wherein the suspension is not only thickened, but the loess particles, on account of their high density, are separated from the lighter clay and coal slimes with which they may be admixed. The degree of clarification can be adjudged by altering the inlet pressure, and the density of the thickened suspension controlled by alterations in the diameter of the exit opening in the cyclone.

SOUTH AFRICAN CUSTOMS DUTIES

THE DEPARTMENT OF OVERSEAS TRADE reports that applications have been received from South African manufacturing and commercial interests for increases of duty on arsenite of soda, mono-ammonium phosphate (for other than agricultural purposes), and potassium nitrate, when imported into the Union of South Africa.

United Kingdom firms or trade associations desiring to make representations to the Board of Trade in respect of these items should communicate with the Department of Overseas Trade, Great George Street, London, S.W.1, quoting reference 16086/37.

WATER JET PUMPS

THE LONDON FIRM of scientific equipment makers, Messrs. W. Edwards and Co., have just sent us details of their new metal water jet pumps which will be of particular interest to all laboratory workers and pharmaceutical and general chemical manufacturers. They claim that the superior jet design gives remarkable efficiency and that the pumps will reach the highest possible vacuum, 12mm. Hg. The pumps are adapted for rubber or screw connection to water supply and, at a water pressure of only 15 lb. per square inch, have very rapid pumping speeds. As they are constructed of metal they are, of course, unbreakable and in the event of corrosion they are readily dismantled for cleaning.

The majority of water jet pumps have, prior to the war, been imported, but Edwards are so confident that their new models are superior to any hitherto obtainable that they are prepared to send one for free test and trial anywhere in the United Kingdom.

PERSONAL NOTES

DR. SYDNEY ALFRED SMITH has been re-appointed a member of the Poisons Board for a term of 3 years, by the General Medical Council.

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MR. C. DALLEY was re-appointed president, for the second year, at the recent annual general meeting of the Oil Industries Club, which continues to hold its monthly luncheons in London.

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MR. W. J. TENNANT, senior partner of Boulton, Wade and Tennant, chartered patent agents, 112 Hatton Garden, London, E.C.1, has retired from the partnership and from practice.

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DR. C. H. DESCH, who retired from the post of Superintendent of the Department of Metallurgy and Metallurgical Chemistry, National Physical Laboratory, on December 31 last, having attained the normal age limit, will be succeeded by DR. C. SYKES, of the Metropolitan Vickers Research Laboratories, who will take up his duties at Teddington on March 1.

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A farewell dinner was given by Lord Leverhulme to MR. J. L. FERGUSON, who retired at the end of last year from the board of Lever Bros. and Unilever, Ltd. Mr. Ferguson joined the company 42 years ago and for 33 years occupied the position of sales director. He was presented with a silver salver in commemoration of his services with the company.

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CAPTAIN RICHARD C. PETTER, M.I.MECH.E., who is also a director of Associated British Engineering, Ltd., London, and of Petters, Ltd., Loughborough; and MR. CHARLES L. HILL, who is also a director of Associated British Engineering, Ltd., London, and Heenan and Froude, Ltd., Worcester, and managing director of Charles Hill and Sons, Ltd., Bristol, have been elected to the Board of the Brush Electrical Engineering Co., Ltd., Loughborough.

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MR. J. H. CROSSLEY, B.Sc., sales manager of Birmingham Electric Furnaces, Ltd., has just returned to England by air from South Africa, where he supervised the erection of the largest electric arc furnace yet installed in South Africa. MR. ALAN E. PICKLES, assistant sales manager of the same company, recently left England for Australia, accompanied by his wife and family, to take up a new position as general manager of a branch which is to be established in Sydney.

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MONSIEUR RAOUL DAUTRY, French Minister of Armament, who is in London for conversations with Mr. Leslie Burgin, Minister of Supply, is a former pupil of the Ecole Polytechnique. In November, 1928, he was appointed by the Government to be Director-in-Chief of the State Railways, a position which he occupied until June, 1937, and he has since been one of the experts of the National Economic Council from its inception. M. Dautry is a Grand Officer of the Legion of Honour. He became Minister of Armament on September 16 last.

OBITUARY

SIR FRANCIS GOODENOUGH, C.B.E., for many years chairman of the British Commercial Gas Association, died on January 11, aged 67.

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MR. ALEXANDER F. MENZIES, who for about 20 years was connected with Redline Glico-Oil Co. as Northern area manager, died recently at Perth.

MR. GEOFFREY CECIL CARTER died at his home in Sheffield last week, aged 54. He was a director and secretary of Carter and Sons, manufacturing chemists, Attercliffe, Sheffield, and was an ex-president of the Northern Section of the Association of Wholesale Druggists.

MR. GEORGE PEPLER NORTON, of Torquay, chairman of the Yorkshire Copper Works, Ltd., and former director of the British Dyestuffs Corporation, Ltd., left £176,528 (net personalty £155,263).

A NEW THERMOPLASTIC

THE steady expansion in the use of plastics in industry requires new methods for the working of a new thermoplastic material briefly described in a recent issue of the technical section of *Deutsche Bergwerks Zeitung*.

As generally known, the usual plastic materials in the mass must be shaped and finished by the ordinary tools, as their hardening cannot be reversed. But thermoplastic material manufactured on the basis of polyvinylchloride from acetylene can be changed in form by reversing the hardening and this property secures for it a very extensive sphere of use. Pieces of the material of suitable measurement can be welded together by softening the surfaces to be joined and employing a suitable welding equipment. Naturally this cannot be effected by the ordinary welding burner which would decompose the organic material, but must be done by directing a hot air or gas stream on the surfaces. The melting point of the material lies between 230 and 270° C., and if the air or gas is heated in a special burner up to this temperature, and is directed on to the surfaces, with the burner at a distance of from 5 to 10 mm., a gradual softening takes place. The additional material is in the form of a wire of the thermoplastic material in the burner which is used to join the two surfaces and the seam is smoothed and finished with the mouth of the burner.

Naturally care must be taken to ensure that the surfaces are wholly united; where this is not the case, the defect may be made good by drilling a hole to the disunited part and welding through this. In *Autogen. Metallbearbeitung*, 12, 1939, it is said that in this way apparatus for the chemical industry can be made of this thermoplastic material with a specific gravity of 1.4 which constitutes a valuable substitute for the heavy and thick-walled containers for containing sulphuric or fluoric acid.

TREATMENT OF COOLING WATER

A difficulty frequently found in cooling waters operating in a closed circuit system is that of the development of algae or other organic growths in the water. These form deposits as well as attacking the metal on which they form. An interesting method of suppressing them has been proposed after considerable experiment by various American firms. It is to add sodium pentachlorophenol to the water. It is claimed that about one part of pentachlorophenol in 100,000 parts of water is sufficient, but a more economical method has been found, which takes into consideration the possible variations in individual cases. This is to add about one ounce of pentachlorophenol per cubic yard of water, which is an excessive dose, and then wait until the deposits have disappeared, a matter of a few days. As fresh water is added, no more of the substance is mixed with it, so that the pentachlorophenol content slowly drops. When the deposit begins to form again, a fresh dose of about one ounce to six cubic yards of water is added, which will be the most economic concentration for that particular case. By calculating the concentration at that moment, the amount of pentachlorophenol to be added to fresh water can be determined, and the correct amount added.

A Chemist's Bookshelf

DISCOVERY OF THE ELEMENTS, by Mary Elvira Weeks; fourth edition. Easton, Pa., U.S.A.: Journal of Chemical Education. Pp. v and 470. \$3.50.

This revised and enlarged edition of Professor Weeks's admirable survey of chemical history makes fascinating reading, and its altered format is a distinct improvement. Every perusal of this work evokes astonishment at the extraordinary amount of detailed investigation which must have been employed in amassing and selecting so great a quantity of interesting facts. The chemists, ancient and modern, therein delineated are made to seem alive; not merely laboratory robots, but actual working men. The work they performed is systematically arranged and sympathetically described. The numerous illustrations are well chosen, though perhaps Berzelius gets more than his fair share of space; and—a very important matter to-day—the completely international nature of Science and the friendly relations between chemists of different nations stand out strongly. One small point: surely the name of cadmium is derived, not from calamine, as implied on p. 232, but from the ancient name "cadmia," the cadmium-bearing earth which reached Europe from the East, and was called after the legendary hero Cadmus.

A HISTORY OF CHEMISTRY, by F. J. Moore; third edition, revised by W. T. Hall. London: McGraw-Hill. Pp. xxi and 447. 20s.

This useful and interesting handbook, in the well-known International Chemical Series, is a re-issue of Professor Moore's work which first appeared in 1918 as the outcome of a series of talks given to his students. Though in certain detailed respects it has not been brought up to date—it implies, for example, that Rutherford is still living—it is valuable as a book of reference in that it relates the names of distinguished chemists to the work which they carried out. The principle of giving space to achievement in relation to its historical importance rather than to its actual utility is carried on from the original edition. The authors are American and their observations on American chemists are particularly informative and well documented. Some of the illustrations might have been better reproduced.

LABORATORY EXERCISES IN INORGANIC CHEMISTRY, by J. F. Norris and K. L. Mark; second edition. London: McGraw-Hill. Pp. xiii and 574. 12s.

The usefulness of this convenient laboratory manual well warrants the appearance of a second edition. It contains a large number of new experiments designed to illustrate the general principles now emphasised in chemical instruction; among subjects treated for the first time in the new edition are colloids, pH, and buffer solutions. Blank interleaving gives room to record the student's answers to the questions arising out of each experiment.

Excess Profits Tax

A Memorandum from the F.B.I.

WHEN the Chancellor of the Exchequer imposed the E.P.T. in the Emergency Finance Act last autumn, he said that, although it was desired to pass it at once, there would be time before the normal Budget in the spring for the consideration of any amendments. It is with this in view that the attached memorandum has been drawn up.

The war of 1914, when Excess Profits Duty was imposed, succeeded a time of mainly steady and profitable trade, whereas 1939 follows a period which to many industries brought sub-normal or greatly varying trading conditions. The Federation feels that this difference in circumstances between 1939 and 1914 make it most necessary that the reliefs available to the taxpayer for E.P.T. should be at least as great as were deemed just for E.P.D.

The Federation recognises the wide choice of periods which

may be taken for the purpose of establishing standard profits, but notes that, under the present Act, the year 1938 cannot be included even for the purposes of an average. It is urged that power should be given to the Board of Referees to permit a taxpayer, or an industry, or section of an industry, to include 1938, at least in an average with one of the preceding years, if this course appears to the Board to be just.

The Act recognises that in certain cases the profits standard may not give a fair basis of calculation. The Federation takes the strongest exception to the substituted standard being based upon an arbitrary rate of interest calculated upon the ordinary share capital. This, the Federation suggests, is a totally fictitious basis for calculating the normal profitability of a company. The profits of an established company are earned not merely by the ordinary share capital, but by this capital supplemented by undistributed profits which have been ploughed back into the business, and the F.B.I. feels that the only fair basis for computing the capital standard must have regard to the reserves invested in the business. This principle was recognised during the war of 1914 when, under the old Excess Profits Duty, a substituted standard was permitted, based on the real capital employed.

The Federation wishes to see repeated the discretionary powers, in connection with various points, which, under the old Excess Profits Duty, were granted to the Commissioners of Inland Revenue. These powers led to a great measure of fairness and uniformity of treatment between different taxpayers. For example, the cost of plant provided for war purposes but useless afterwards must be met by depreciation allowances. Such allowances in the last war were within the discretion of the Commissioner. It is important that these allowances should be adequate, or manufacturers will be involved in heavy loss.

At the time of the old Excess Profits Duty, the modern practice of conducting businesses through groups of companies was less widely developed than nowadays. Several points in the proposals for Excess Profits Tax dealing with principal and subsidiary companies may work hardship or are obscure. In particular, it is felt that each company in a group of companies should be allowed to arrive at its standard independently of the rest. These standards then ought to be added together for purposes of taxation to form a general standard for the whole group.

NEW SUPPLY AREA ORGANISATIONS

As indicated recently in the House of Commons, Area Boards and Advisory Committees are being established throughout the country to assist in the development of industrial production for war purposes. The first of these bodies was set up in the Midland area with headquarters at Birmingham on January 19, when Mr. Leslie Burgin, Minister of Supply, entertained a number of prominent industrialists and representatives of employees' organisations at luncheon.

The members of the Midland Area Board are: Engr. Rear Admiral H. L. Parry, C.B., O.B.E., Admiralty; Engr. Rear Admiral F. S. Carlisle, C.B.E., Ministry of Supply; Mr. F. J. W. Hedgcock, A.M.I.M.E., Principal Inspection Officer, Air Ministry; Mr. W. E. Barltrop, D.S.O., C.B.E., Divisional Controller, Midland Division, Ministry of Labour. Mr. Phillip Handley (formerly of the Ministry of Labour) is secretary of the Board.

The terms of reference of the Area Advisory Committees have been widely drawn in consultation with representatives of the employers' and employees' organisations. Briefly, the Committees are to advise the Boards regarding efficient output, to assist in the survey of areas in respect of industrial capacity, and to make recommendations to the Boards. At the same time it is made clear that both Boards and Committees will deal with questions of production and not with labour problems, for which adequate machinery exists through the Ministry of Labour and the employers' and employees' organisations.

General News

PLANT COSTING £3,500 is to be installed by Paisley Town Council for the purpose of benzol and toluol recovery from the local gasworks.

THE EMPLOYEES OF Messrs. Stewarts and Lloyds, Ltd., tube manufacturers, Glasgow, have contributed £3,468 to local charitable institutions during 1939.

A SECOND EDITION of the useful "Memorandum on Precautions in the Handling, Storage and Use of Liquid Chlorine," produced by the Factory Department, Home Office, has just been published by H.M. Stationery Office, price 2d.

THE URBAIN MEMORIAL LECTURE of the Chemical Society will be delivered by Dr. A. S. Russell, M.C., at 2.30 p.m. on Thursday, February 15, in the rooms of the Society, Burlington House, London, S.W.1.

MIDDLESBROUGH'S APPLICATION for extra food rations, because of the heavy nature of the work in the iron and steel plants where thousands of workers are engaged at top pressure, has been rejected by the Chief Food Controller.

LIVERPOOL TECHNICAL COLLEGE SCHOLARSHIPS and special prize awards include the following: British Association special prize (value £10), Philip H. Daniels; Norman Tate Memorial Prizes for Chemistry, Alan Booth and Dennis L. Farrall; Society of Chemical Industry prizes (value £15), Sidney P. Hayes, Angus A. McKerrigan and John Simpson.

AT THE INSTITUTION OF MECHANICAL ENGINEERS, Storey's Gate, London, S.W.1, on Thursday, January 25, at 2.15 p.m., a paper will be presented to the Institute of Fuel by Messrs. N. L. Hudson, R. J. Bressey and T. C. Bailey entitled "Pool Grades of Gas, Diesel and Fuel Oils and their Efficient Utilisation in Oil-Burning Installations." Mr. Isaac Lubbock will be in the chair.

PROFESSOR J. D. BERNAL, F.R.S., is to address the Manchester Local Sections of the Institute of Chemistry, Society of Chemical Industry, Chemical Society, Manchester Literary and Philosophical Society, and other societies of the "Joint Advisory Committee" on "The Social Function of Science." The meeting will take place in the Chemical Lecture Theatre of the University on Saturday, January 27, at 2.30 p.m., and will be preceded by a lunch in the College Refectory, at 1.15.

MR. GEOFFREY LLOYD declared in the House of Commons on Tuesday that in 1938 there were in operation 13 low-temperature carbonisation plants and one hydrogenation plant. Production of oil from coal in that year in coke ovens, gas works and tar distilleries and by hydrogenation and low-temperature carbonisation had been as follows: Motor spirit, 358,800 tons; creosote, heavy oils and Diesel oil, 477,000 tons; light oils, other than motor spirit, 46,400 tons.

REPRESENTATIONS HAVE BEEN MADE, in the Yorkshire Section of the Society of Chemical Industry, in favour of a renewal of contacts by meetings. In order to test the feeling of members, the Committee has arranged a meeting to be held (near the time of full moon) on Monday, January 22, in the Hotel Metropole, Leeds, from 6 to 8 p.m. It is hoped that the Committee's action will be justified by the attendance. The following papers have been promised: "Modern Heat Insulating Materials," by A. L. Roberts, Ph.D., A.I.C.; and "Methods for Determining the Composition of Fats," by H. K. Dean, B.Sc., Ph.D., A.I.C.

THE NEXT MEETING of the Plastics Group of the Society of Chemical Industry will take the form of a Joint Symposium with the Faraday Society at Caxton Hall, London, S.W.1, on Friday, January 26, at 6.30 p.m. The symposium will be entitled: "Molecular Size and Structure and their Influence on the Properties of Plastics." The following papers will be presented: 1, "The Mechanism of the Polymerisation of Vinyl Acetate and Methyl Vinyl Ketone," by Dr. H. W. Melville and co-authors; 2, "Derivatives of Natural Resins and their Polymerisation," by Dr. R. Bhattacharya; 3, "The Materials of Current Plastics," by E. Couzens, E. Turner and Dr. Hetherington.

NEGOTIATIONS ARE IN PROGRESS for the transfer of the silk dyeing business carried on at Netherton, near Huddersfield, by Messrs. G. W. Oldham, to be incorporated in the firm of John W. White and Sons, Ltd., at Sutton Dye Works. The negotiations, which have been between Major G. H. Oldham

From Week to Week

and Mr. W. W. White, provide for Messrs. Whites' to acquire the goodwill of Messrs. Oldhams' business, and that, as soon as the transfer of the essential machinery to Macclesfield is completed, the Netherton works will close. The present transfer was first considered because Major G. H. Oldham is on active service with H.M. Forces, and, as the two firms have been friendly competitors in an exactly similar trade for many years, a union of their interests and administration would prove economical.

Foreign News

OWING TO THE SHORTAGE of raw materials in Italy it is reported that soap manufacturers will shortly be compelled to produce a single type of soap, to be sold at a price fixed by government.

SHIPMENTS OF PHOSPHATE ROCK from French Morocco are continuing, but difficulty is reported in obtaining ships. Licenses for the export of phosphate will be granted by the Director of Mines at Rabat, French Morocco, subject to the approval of the Resident Commissioner General.

IN WASHINGTON, on January 9, a replica of the Myddelton Cup was presented to the American Society of Civil Engineers by Lord Lothian, British Ambassador to the United States, on behalf of The Institution of Civil Engineers, in token of the friendly relations which have always existed between the two Societies.

EXPORTS OF CALCIUM CARBIDE from Norway during the first nine months of 1939 were reported at 49,990 metric tons, 50 per cent. over the volume shown for the corresponding period of 1938. Great Britain alone accounted for 47,903 tons of the 1939 figure. On the other hand a small loss was recorded in the exports of sulphur materials, notably in the case of copper-bearing pyrites.

ALTHOUGH THE UNITED STATES is one of the best-placed countries as regards self-sufficiency in raw materials for industry, nevertheless a scarcity of certain products has resulted from conditions arising from the war. Montan wax and ozokerite, for instance, which used to be imported from Germany and neighbouring countries, are almost unobtainable. Beeswax, mainly imported from Africa, Chile and Brazil, is likewise scarce. Carnauba wax has doubled in price. The lack of these materials has affected the manufacturers of polishing preparations, varnishes, paints, paper and textile sizing. The importation of shellac and vegetable gums from the Near and Far East has also been considerably interfered with.

IN ORDER THAT a new source of high-octane aviation fuel should be available in case of national emergency, five American oil companies have combined their experience and have produced new methods of obtaining large quantities of 100-octane super-aviation petrols, using sulphuric acid as catalyst. The combined companies are the Anglo-Iranian Oil Company, the Standard Oil Development Company, the Humble Oil and Refining Company, the Shell Development Company and the Texas Company. During 1937 the amount of super fuels used for aircraft amounted to about 7 million gallons, and this had already risen sharply to 20 million in 1938. It was disclosed at a recent meeting of the American Petroleum Institute in Chicago that the actual product obtained has an octane number of 85, and with the addition of a small amount of tetraethyl lead it is developed into a 100-octane fuel.

IN THE PAST TWO MONTHS there have been at least two arrivals of cargo steamers at the Trenton Marine Terminal, Trenton, N.J., each carrying a heavy tonnage of Cornish china and ball clays, and Cornwall stone. The first of these was the *Askot*, a new Norwegian boat, which sailed from Fowey and arrived, after an uneventful crossing, on November 15. A second arrival on December 4—the largest cargo of this kind to arrive at the port of Trenton—is reported by *The Ceramic Age*, of Newark, N.J. With the inaccurate and misleading information frequently heard regarding restrictions of clay from England (which is not the case), non-shipments, non-arrivals and similar references, it is interesting to have such first-hand and accurate information. Our American contemporary is reliably informed that there is sufficient English clay and other ceramic raw materials on hand to meet all requirements of the American potter—now and for months to come.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

PROCESS FOR PREPARING $\alpha\beta$ -di-alkyl- $\alpha\beta$ -di-aryl-ethanes.—Chinoin Gyógyszer és Vegyszeri Termékek Gyára r.t. (Dr. Kereszty and Dr. Wolf). (Hungary, Dec. 24, '38.) 32423. (Hungary, Jan. 3.) 32424. (Hungary, Feb. 14.) 32425.

POLYMERISATION OF ORGANIC COMPOUNDS.—Distillers Co., Ltd., H. M. Stanley and T. Weir. 32473.

PRODUCTION AND TREATMENT OF organic compounds.—H. Dreyfus. 32185.

DEHYDROGENATION.—H. Dreyfus and W. H. Groombridge. 32552.

PLASTIC COMPOSITIONS.—E. I. du Pont de Nemours and Co. (United States, Dec. 21, '38.) 32514, 32596.

METHODS OF PRESERVING abrasive coated material.—Durax Abrasives, Ltd. (United States, Dec. 27, '38.) 32325, 32331.

PROCESS FOR THE PRODUCTION OF valuable organic products of high molecular weight.—J. G. Fife (N. V. de Bataafsche Petroleum Maatschappij). 32189.

MANUFACTURE OF HYDROGEN GAS.—J. P. Fraser. 32268.

PROCESS OF AND APPARATUS FOR the production of coke, gas, and by-products in vertical retorts.—Gas Chambers and Coke Ovens, Ltd., and A. H. Lymn. 32592.

PROCESS FOR THE PRODUCTION OF halogen substituted acyl amino sulphonic acids, and the resulting products.—J. R. Geigy A.-G. (Switzerland, Dec. 19, '38.) 32403.

PREPARATION OF HETEROCYCLIC NITROGEN COMPOUNDS.—Gevaert Photo-Producten N.V., G. Schwarz and P. de Smet. 32579.

MANUFACTURE OF DERIVATIVES OF AMINES.—Glaxo Laboratories, Ltd., F. A. Robinson, J. C. L. Resuggan, and G. L. Rusby. 32441.

MOULDING PLASTICS.—Hartford-Empire Co. (United States, Dec. 21, '38.) 32621.

MANUFACTURE OF PRODUCER-GAS, and generators therefor.—A. E. Morrison and A. C. Morrison. 32207.

GAS-PRODUCER PLANTS OR FURNACES.—A. E. Morrison, A. C. Morrison and M. R. Morrison. 32208.

PROCESS FOR DRESSING COALS by employing an aqueous heavy suspension produced from silt.—H. Osgawa. 32513.

PROCESS FOR THE PREPARATION OF water-soluble dyestuffs of the anthraquinone series.—Sandoz, Ltd. (Switzerland, Dec. 19, '38.) 32530. (Switzerland, April 22.) 32531.

PROCESS FOR THE MANUFACTURE OF magnesium hydroxide.—J. C. Séailles. (Luxembourg, Dec. 27, '38.) 32330.

COATING COMPOSITIONS, and coated textile fabrics.—W. F. Smith, J. R. S. Waring and Imperial Chemical Industries, Ltd. 32246.

TREATMENT OF HYDROCARBONS.—A. H. Stevens (Phillips Petroleum Co.). 32597.

RENDERING MATERIALS ANTISEPTIC OR GERMICIDAL.—W. Thomas and E. G. Cooper. 32239.

GAS-PRODUCERS FOR COAL TAR PRODUCTS.—E. M. Topcott. 32270.

APPARATUS FOR TRANSFORMING a liquid into an aerosol by ultra-atomisation of the liquid.—V. A. Trier and Andre (Components), Ltd. 32511, 32512.

GAS-PRODUCERS FOR MOTOR VEHICLES.—Vauxhall Motors, Ltd., and D. Blythe. 32484.

USE OF PRODUCER-GAS, ETC.—J. Weller. 32399.

PROCESS OF MAKING RUBBER HYDROCHLORIDE FILMS.—Wingfoot Corporation. (United States, Dec. 23, '38.) 32449.

PROCESS FOR PREPARING ARTICLES for cellulose esters.—Afaq Finanzierungs A.-G. (France, Dec. 21, '38.) 32697.

COMPOSITIONS FOR THE TREATMENT OF plants, seeds, and soils.—American Chemical Paint Co. (United States, Dec. 23, '38.) 32797.

Complete Specifications Open to Public Inspection

PROCESS FOR PREPARING saturated hydrocarbons with branched, or more highly branched, chains from saturated hydrocarbons.—N. V. de Bataafsche Petroleum Maatschappij. May 21, 1938. 12313/39.

PROCESS FOR THE POLYMERISATION OF unsaturated hydrocarbons. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. May 16, 1938. 11952/39.

METHOD OF PREPARING finely comminuted oxides.—Corning Glass Works. May 14, 1938. 12059/39.

WATERPROOF CELLULOSIC PELLICLES, and compositions for preparing same.—Sylvania Industrial Corporation. May 14, 1938. 12384/39.

PROCESS FOR THE MANUFACTURE OF phosphoric acid dichlorides of 4-amino benzene sulphonamides.—F. Hoffmann-La Roche and Co., A.-G. May 16, 1938. 12620/39.

PROCESS FOR THE PRODUCTION OF elementary sulphur from hydrogen sulphide or from gases containing same.—Metallgesellschaft A.-G. May 14, 1938. 13241/39.

PRODUCTION OF β -ALKOXY-CARBOXYLIC ACIDS.—Deutsche Gold und Silber-Scheideanstalt vorm. Roessler. May 19, 1938. 13734/39.

PROCESS FOR REFINING hydrocarbon mixtures in the vapour phase. N. V. de Bataafsche Petroleum Maatschappij. May 18, 1938. 13984-5/39.

MANUFACTURE OF DIPHENYLSULPHONE DERIVATIVES.—I. G. Farbenindustrie. May 20, 1938. 14097/39.

PROCESS, PRODUCT, AND APPARATUS for breaking-up and/or extinguishing the floating sheets of hydrocarbons.—B. P. M. Le Gouz de St. Seine. May 14, 1938. 14272/39.

MANUFACTURE OF A NAPHTHALENE DERIVATIVE.—I. G. Farbenindustrie. May 14, 1938. 14368/39.

HYDROGENATING CATALYSTS.—Standard I-G Co. May 20, 1938. 14437/39.

MANUFACTURE OF DERIVATIVES OF aliphatic amino-sulphonic acids. I. G. Farbenindustrie. May 23, 1938. 14441/39.

PRODUCTION OF LIGNIN.—Northwood Chemical Co. May 17, 1938. 14594/39.

MANUFACTURE OF MELAMINE.—Soc. of Chemical Industry in Basle. May 21, 1938. 14722/39.

PROCESS AND APPARATUS for de-waxing wax-containing hydrocarbons by centrifuging in two or more stages.—A.-B. Separator-Nobel. May 17, 1938. 14728/39.

MANUFACTURE OF DYESTUFFS of the anthraquinone series.—I. G. Farbenindustrie. May 18, 1938. 14755/39.

MANUFACTURE OF A NAPHTHALENE DERIVATIVE.—I. G. Farbenindustrie. May 17, 1938. 14757/39.

MANUFACTURE OF CONDENSATION PRODUCTS.—I. G. Farbenindustrie. May 17, 1938. 14759/60/39.

PROCESS FOR DE-WAXING and refining hydrocarbon oils.—A.-B. Separator-Nobel. May 20, 1938. 14851/39.

MANUFACTURE OF AZO DYESTUFFS capable of being metallised.—I. G. Farbenindustrie. May 21, 1938. 14946/39.

MANUFACTURE OF POLYMERISATION PRODUCTS.—Rohm and Haas Ges. May 20, 1938. 15100/39.

MANUFACTURE OF SYNTHETIC RUBBER-LIKE MATERIALS.—I. G. Farbenindustrie. May 23, 1938. 15223/39.

DYEING OR PRINTING with anthraquinone derivatives.—Durand and Huguenin A.-G. May 23, 1938. 15293/39.

Specifications Accepted with Date of Application

PRODUCTION OF ALKAMINE ESTERS.—Chemische Fabriken Dr. J. Wiernik and Co. June 5, 1937. 515,501.

MANUFACTURE OF KETONES or their enol derivatives.—Soc. of Chemical Industry in Basle. June 5, 1937. (Cognate Applications, 16968/38 and 16969/38.) 515,591.

BREAKING OF EMULSIONS.—I. G. Farbenindustrie. June 8, 1937. (Cognate Application, 17019/38.) 515,631.

PROCESS FOR THE MANUFACTURE OF phthalocyanine sulphonic acid chlorides.—I. G. Farbenindustrie. June 8, 1937. 515,637.

METHOD OF PRODUCING COATINGS on magnesium or its alloys.—Magnesium Elektron, Ltd. (I. G. Farbenindustrie). June 23, 1938. 515,648.

PREPARATION OF CEMENT RAW MATERIALS.—F. L. Smidth and Co. Aktieselskab. Sept. 10, 1937. 515,608.

RECOVERY OF GLYCEROL from still residues from fermentation processes.—R. A. Walmesley and Imperial Chemical Industries, Ltd. March 4, 1938. 515,831.

PREPARATION OF SENSITIVE COLLOID FILMS.—O. Czeija and F. Lieng. Oct. 14, 1937. 515,732.

MANUFACTURE OF 1-CYANOBUTADIENE-1:3.—H. Gudgeon, R. Hill, and Imperial Chemical Industries, Ltd. April 13, 1938. 515,737.

METHOD OF AND APPARATUS for mixing gases and liquids in the oxidation of high molecular hydrocarbons into fatty acids, alcohols or the like.—W. H. A. Thiemann (W. A. Farenholtz, G. Hubbe and H. Hubbe (trading as Vereinigte Oelfabriken Hubbe and Farenholtz)). June 10, 1938. 515,720.

MANUFACTURE OF α -CHLORO- β -ALKOXYBUTYRALDEHYDES.—W. W. Groves (I. G. Farbenindustrie). June 17, 1938. 515,756.

MANUFACTURE OF SYNTHETIC RESINS.—Soc. des Usines Chimiques Rhone-Poulenc and S. Iavorsky. June 14, 1938. 515,894.

ETHERIFICATION OF CELLULOSIC FIBRES.—F. H. Reichel. June 14, 1938. 515,855.

MANUFACTURE OF DIARYLMETHANE DERIVATIVES.—Deutsche Hydrierwerke A.-G. June 15, 1937. 515,907.

MANUFACTURE OF ZIRCONIUM COMPOUNDS.—A. G. Allen (Stockton), Ltd., and D. Tyrer. June 27, 1938. 515,725.

SEPARATION OF CONSTITUENTS OF COAL DISTILLATION GASES and the like.—British Oxygen Co., Ltd., and P. M. Schuftan. July 1, 1938. 515,776.

MANUFACTURE AND PRODUCTION OF PYRROLES.—G. W. Johnson (I. G. Farbenindustrie A.-G.). July 1, 1938. 515,865.

PROCESS FOR THE MANUFACTURE OF improved oils, particularly such as are stable during storage and at increased temperature. Deutsche Erdöl A.-G. July 9, 1937. 515,918.

PRODUCTION OF HYDROCARBON PRODUCTS by destructive hydrogenation of solid carbonaceous materials.—H. E. Potts (N. V. Internationale Hydrogeneerings-octrooien Maatschappij (International Hydrogenation Patents Co.)). July 11, 1938. 515,928.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

GAY WILKINSON, LTD. (formerly Permalac Varnish Co., Ltd.), London, S.E. (M., 20/1/40.) Jan. 4, £1,000 second debenture to V. N. B. Were, London; general charge. *£500. Dec. 27, 1938.

Companies Winding-Up Voluntarily

LAMINOID PRODUCTS, LTD. (C.W.U.V., 20/1/40.) Jan. 3. H. J. Staines, 171 Shaftesbury Avenue, W.C., liquidator.

Receiverships

TOWER MANUFACTURING AND CHEMICAL COMPANY (LITTLE HULTON), LTD. (R., 20/1/40.) John Spalding, 22 Booth Street, Manchester. Dec. 30, 1939.

County Court Judgment

NORTHERN VARNISH CO., LTD. (C.C.J., 20/1/40.) East Street, Manchester, 2, paint manufacturers. £10 14s. 1d. Dec. 14.

Petitions Presented

ASBESTOS MOLYBDENUM AND TUNGSTEN CO., LTD. (P.P., 20/1/40.) Jan. 4, by Lionel Crystoline Asbestos Co., Ltd., and another. Hearing, Royal Courts of Justice, Strand, Jan. 22. Solicitors, Mackay and Watkins, 4 Gower Street, W.C.

Receivers Ceasing to Act

BERRY AND SONS, LTD., Barnstaple, corn cake and manure merchants. (R.C.A., 20/1/40.) R. E. Ware. Dec. 4.

ROBIN HOOD OXIDE AND IRON CO., LTD., London, E.C. (R.C.A., 20/1/40.) E. W. Lowe. Jan. 4.

Chemical Trade Inquiries

South Africa and Rhodesia.—A firm of agents established at Johannesburg wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of heavy chemicals, pharmaceutical products, patent medicines, preserves and food-stuffs, for the Union and Rhodesia. (Ref. No. 31.)

Chemical and Allied Stocks and Shares

EARLIER in the week the latest developments in the European situation were reflected in the stock and share markets by a marking down of gilt-edged and other securities. This was, however, mainly a precautionary measure, and later when it was apparent that no heavy selling was likely, firmer conditions prevailed, and earlier losses were partly regained. With few exceptions movements in shares of chemical and kindred companies were small, and on balance prices were little changed as compared with a week ago. Imperial Chemical at 29s. 9d. were within 6d. of the price ruling a week ago, while the 7 per cent. preference units were maintained at 30s. B. Laporte improved from 59s. to 60s. and Fison Packard were better at 36s. 3d., while Greiff-Chemicals Holdings 5s. units transferred around par. Imperial Smelting remained around 13s. and in other directions Erinoid were 3d. better at 4s. Monsanto Chemicals 5½ per cent. preference shares continued to be quoted at 21s. 3d.

* * * *

European political developments affected sentiment in regard to Lever and Unilever and Lever N.V. which were lower at 29s. 9d. and 29s. 4½d. respectively, but Swedish Match were better at 12s. 6d. Textile shares came in for profit-taking following their recent rise, and Courtaulds went back to 34s. 9d. due to the prevailing tendency in leading ordinary or equity shares. It may be recalled that Courtaulds increased its interim payment from 1½ per cent. to 2 per cent. The results for 1939, due next month, are expected to show some improvement over the 4 per cent. total dividend distributed for 1938, while the market is also continuing to take the view that the company is likely to do considerably better in the current year. British Celanese were lower, and elsewhere Calico Printers, Bleachers and Bradford Dyers ordinary and preference units lost part of their recent improvement. There was also an easier tendency in iron and steel securities, Dorman Long being 26s. 3d., United Steel 21s. 6d. and Guest Keen 22s. 9d. Babcock and Wilcox were relatively steady at around 42s. 9d., while Ruston and Hornsby

Company News

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, have declared the following dividends, less tax, payable on February 15, 1940: Three per cent. on the preference shares for the half-year ended December 31, 1939, and an interim dividend of four per cent. on the ordinary shares (five per cent. in 1939).

The nominal capital of Bowmans (Warrington), Ltd., manufacturing chemists, of Moss Bank Works, Widnes, Lancs., has been increased by the addition of £30,000, beyond the registered capital of £30,000. The additional capital is divided into 150,000 ordinary shares of 4s. each.

The directors of the Midland Bank, Ltd., report that the net profits for the year ended December 31, 1939, amounted to £2,181,350 15s. 5d., which, with the balance of £628,315 0s. 5d. brought forward from last account, makes a total sum of £2,809,665 15s. 10d. Out of this amount an interim dividend for the half-year ended June 30, 1939, at the rate of 8 per cent., less income tax at 5s. 6d. in the £, accounts for £879,200 0s. 4d.; £500,000 is allotted to reserve; and a dividend, payable February 1, 1940, for the half-year ended December 31, 1939, at the rate of 8 per cent., less income tax at 7s. in the £, making 16 per cent. for the year, amounts to £788,248 5s. 10d., leaving a balance of £642,217 9s. 8d. to be carried forward to next account.

New Companies Registered

B.B. Technical Industries (Manufacturing), Ltd. (358,635).—Private company. Capital, £1,000 in 1,000 ordinary shares of £1 each. To carry on the business of manufacturers of and dealers in chemicals and chemical substances, minerals of all kinds, fluorescent or luminescent materials, paints and substances, woods, engineering and turnery or joinery products, glass and metals and metallic substances, etc., and to acquire the business carried on at Mowbray House, Ealing Road, Northolt, Middlesex, as B.B. Technical Laboratories, Ltd., and to adopt an agreement between the said company and W. D. Furniss. Subscribers: George B. Winsor, J. L. Haines. Permanent directors: William D. Furniss, Gerard F. Brennan, John P. Brennan, Frank Humphries and Leonard M. Scrutton. Solicitors: Furniss, Wells and Co., Princes Court, 7 Princes Street, E.C.2. Registered office: Princes Court, 7 and 9 Princes Street, E.C.2.

Thompson, L'Hospied and Company, Ltd.—(358,342). Private company. Capital, £5,000 in 5,000 shares of £1 each. To acquire the business of buyers, manufacturers, importers, and exporters of and dealers in chemicals of all kinds now carried on at High Street, Amblecote, Stourbridge, by Thompson, L'Hospied and Co., Ltd., and to carry on the business of domestic appliance engineers and vitreous enamellers, etc. Directors: Joseph T. Raybould, 36a Waterloo Street, Birmingham; Bernard B. Kent. Solicitors: Redfern & Co., 23 Colmore Row, Birmingham 3.

improved to 29s. 6d. Gas Light and Coke units were 16s. 6d. awaiting the results, which, in common with those of other gas companies, are expected in the market to show lower dividends owing to the changed conditions brought about by the war. British Match remained at 32s. Valor ordinary shares improved to 25s. 3d., which compares with 23s. 6d. a week ago; the results are due during the next few weeks.

* * * *

Awaiting the final dividend announcement, which falls to be made next month, Borax Consolidated deferred units have remained steady around 25s. Cooper McDougall and Robertson ordinary were quoted at 21s. 3d. United Molasses were easier at 25s. 3d. The financial results of the last-named company are expected shortly. Distillers have reacted to 66s. 9d. in sympathy with the general trend on the Stock Exchange, and Pinchin Johnson lost an earlier improvement, but at 18s. were unchanged on balance. Although Reckitt and Sons ordinary reacted 1s. 3d. to 96s. 3d., Cerebos were maintained in price. Cement shares were out of favour, and Associated Cement were lowered to 52s. 6d., while British Plaster Board were 23s. Although the market remains hopeful that Dunlop Rubber may be able to maintain its dividend, the ordinary units failed to move against the general trend, and were lower at 28s. 6d., while reduced prices were also made by Tube Investments, British Oxygen and British Aluminium.

* * * *

Boots Drug at 39s. 6d. were little changed on balance, and Beechams Pills at 7s. 10½d. were also fairly well maintained, while Sangers and British Drug Houses were 20s. 3d. and 21s. 3d. respectively.

* * * *

Oil shares were slightly more active and in some cases showed small gains on the week, including "Shell" at 77s. 6d. and Anglo-Iranian at 56s. 10½d. Somewhat lower prices ruled for Trinidad Leaseholds and Lobitos Oilfields.

Weekly Prices of British Chemical Products

THERE is very little alteration to report in trading conditions in the market for industrial chemicals. A substantial amount of buying for home consumption continues to be in evidence and dealers report a fair export inquiry. There have been no important changes in values but quotations throughout have a firm undertone. Conditions in the market for coal tar products are steady and trade has been on a moderately active scale. Quotations are very largely at last week's levels with the exception of carbolic acid crystals which at 11d. per lb. are slightly dearer. An advance in the quotation for carbolic acid crude 60's is also reported due to the scarcity in supplies.

MANCHESTER.—Much of the business passing on the Manchester chemical market during the past week has been in respect of spot parcels. Contract commitments that are being entered into these days are much less extensive than normally, owing to the reluctance of sellers to commit themselves very far ahead in consequence of the prevailing price uncertainty. Delivery specifications against existing contracts are flowing fairly free, with textile chemicals, in particular, being taken up in improved quantities. Among the tar products values generally remain steady to firm, with a moderate amount of business reported.

GLASGOW.—Business is gradually returning to normal in the Scottish Heavy Chemical market and although there are many

restrictions owing to shortage of supplies, a considerable amount of spot buying is being done. Formaldehyde and dextrines show considerable activity although at increased prices, but there is a very great shortage of all waxes and an intensive search for substitutes is being conducted. It is hoped that after the initial rises in January, prices will stabilise for the next few months.

Price Changes

Rises: Barium Chloride, Carbolic Acid, Pitch, Sodium Hyposulphite (Manchester), Sodium Sulphate (Salt Cake) (Manchester).

Falls: Chrometan, Chromic Acid, Toluol (Manchester).

* In the case of certain products, here marked with an asterisk, the market is nominal, and the last ascertainable prices have been included.

General Chemicals

ACETIC ACID.—Maximum prices per ton: 80% technical, 1 ton, £34 15s.; 10 cwt./1 ton, £35 15s.; 4/10 cwt., £36 15s.; 80% pure, 1 ton, £36 15s.; 10 cwt./1 ton, £37 15s.; 4/10 cwt., £38 15s.; commercial glacial, 1 ton, £44; 10 cwt./1 ton, £45; 4/10 cwt., £46; delivered buyers' premises in returnable barrels. £4 per ton extra if packed and delivered in glass.

ACETONE.—Maximum prices per ton, 50 tons and over, £49 10s.; 10/50 tons, £50; 5/10 tons, £50 10s.; 1/5 tons, £51; single drums, £52, delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each; delivered in containers of less than 45 gallons but not less than 10 gallons £10 10s. per ton in excess of maximum prices; delivered in containers less than 10 gallons each £10 10s. per ton in excess of maximum prices, plus a reasonable allowance.

*ALUM.—Loose lump, £8 7s. 6d. per ton d/d.

*ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lanes.

AMMONIA, ANHYDROUS.—99.95%, 1s. to 2s. per lb. according to quantity in loaned cylinders, carriage paid; less for important contracts.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey galvanising, £18 per ton, in casks, ex wharf. See also Salammoniad.

*ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—99/100%, about £25 per ton, ex store

BARIUM CHLORIDE.—98/100%, prime white crystals, £11 10s. 0d. to £13 0s. 0d. per ton when available, bag packing, ex works; imported material would be dearer.

BLEACHING POWDER.—Spot, 35/37% £9 5s. per ton in casks, special terms for contract.

BORAX, COMMERCIAL.—Granulated, £20 10s. per ton; crystal, £21 10s.; powdered, £22; extra finely powdered, £23; B.P. crystals, £29 10s.; powdered, £30; extra fine, £31 per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £64; powder, £65; in tin-lined cases for home trade only, packages free, carriage paid in Great Britain.

BORIC ACID.—Commercial granulated, £34 10s. per ton; crystal, £35 10s.; powdered, £36 10s.; extra finely powdered, £38 10s.; large flakes, £47; B.P. crystals, £43 10s.; powdered, £44 10s.; extra fine powdered, £46 10s. per ton for ton lots, in free 1-cwt. bags, carriage paid in Great Britain.

CALCIUM BISULPHITE.—£7 10s. per ton f.o.r. London.

*CALCIUM CHLORIDE.—GLASGOW: 70/75% solid, £5 12s. 6d. per ton ex store.

CHARCOAL LUMP.—£7 5s. to £11 per ton, ex wharf. Granulated £7 to £9 per ton according to grade and locality.

*CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4½d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 3½d. per lb.; liquor, £19 10s. per ton d/d station in drums.

CHROMIC ACID.—10½d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—1s. 1d. per lb., d/d U.K.

CITRIC ACID.—1s. 1½d. per lb. MANCHESTER: 1s. 3d.

*COPPER SULPHATE.—Nominal.

CREAM OF TARTAR.—100%, £5 2s. to £5 7s. per cwt., less 2½%. Makers' prices nominal, imported material about £170 per ton.

FORMALDEHYDE.—40% by volume, £23 5s. to £25 per ton, according to quantity, d/d in sellers' returnable casks.

FORMIC ACID.—85%, £44 10s. per ton for ton lots, carr. paid, carboys returnable; smaller parcels quoted at 46s. 6d. to 49s. 6d. per cwt., ex store.

GLYCERINE.—Chemically pure, double distilled, 1,260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

HEXAMINE.—Technical grade for commercial purposes, 1s. 4d. per lb.; free-running crystals are quoted at 1s. 7d. per lb.; carriage paid for bulk lots.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 11s. 2d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £30 10s. per ton; 50% by weight, £35; 80% by weight, £60; pale tech., 50% by vol., £36; 50% by weight, £42; 80% by weight, £67. One ton lots ex works; barrels returnable.

LEAD ACETATE.—White, £48 to £50, ton lots.

LEAD NITRATE.—About £40 per ton in casks.

LEAD, RED.—English, 5/10 cwt., £41 10s.; 10 cwt. to 1 ton, £41 5s.; 1/2 tons, £41; 2/5 tons, £40 10s.; 5/20 tons, £40; 20/100 tons, £39 10s.; over 100 tons, £39 per ton, less 2½ per cent., carriage paid; non-setting red lead, 10s. per ton dearer in each case; Continental material, £1 per ton cheaper.

LEAD, WHITE.—Dry English, less than 5 tons, £51; 5/15 tons, £47; 15/25 tons, £46 10s.; 25/50 tons, £46; 50/200 tons, £45 10s. per ton, less 5% carriage paid; Continental material, £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £59; 5/10 cwt., £58; 10 cwt. to 1 ton, £57 10s.; 1/2 tons, £56; 2/5 tons, £55; 5/10 tons, £53; 10/15 tons, £52; 15/25 tons, £51 10s.; 25/50 tons, £51; 50/100 tons, £50 10s. per ton, less 5% carriage paid. Continental material £2 per ton cheaper.

LITHARGE.—10 cwt.-1 ton, £34 15s. per ton.

MAGNESITE.—Calcined, in bags, ex works, about £9 to £10 per ton.

MAGNESIUM CHLORIDE.—Solid (ex wharf), £10 per ton.

*MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf

MERCURY PRODUCTS.—Controlled prices for 1 cwt. quantities: Bichloride powder, 7s. 5d.; bichloride lump, 8s.; bichloride ammon. powder, 8s. 11d.; bichloride ammon. lump, 8s. 9d.; mercurous chloride, 8s. 11d.; mercury oxide, red cryst., B.P., 10s. 3d.; red levig. B.P., 9s. 9d.; yellow levig. B.P., 9s. 7d.

*METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities.

*NITRIC ACID.—Spot, £25 to £30 per ton, according to strength, quantity and destination.

OXALIC ACID.—£59 5s. per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels, 59s. 9d. to 60s. per cwt., ex store; deliveries slow.

*PARAFFIN WAX.—GLASGOW: 3½d. per lb

POTASH, CAUSTIC.—Liquid, £25 to £30 per ton, according to quantity.

POTASSIUM BICHLORATE.—5½d. per lb. carriage paid. GLASGOW: 5½d. per lb., carriage paid.

POTASSIUM CHLORATE.—Imported powder and crystals, ex store London, 10d. to 1s. per lb.

POTASSIUM IODIDE.—R.P., 9s. 10½d. per lb. in 7 lb. lots; for not less than 1 cwt., 7s. 9d. per lb.

POTASSIUM NITRATE.—Small granular crystals, £26 to £29 per ton ex store, according to quantity.

POTASSIUM PERMANGANATE.—B.P. 1s. 3½d. per lb.; commercial, 143s. per cwt., d/d.

POTASSIUM PRUSSATE.—Yellow, about 1s. 8d. per lb., supplies scarce.

SALAMMONIAC.—Dog-tooth crystals, £42 per ton; medium, £38; fine white crystals, £16; in casks, ex store.

SALT CAKE.—Unground, spot, £3 15s. per ton.

SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £14 per ton d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£25 to £26 per ton, ex wharf.

SODIUM BICARBONATE.—About £10 10s. to £11 10s. per ton, in bags.

SODIUM BICHROMATE.—Crystals, 4½d. per lb., net d/d U.K. with rebates for contracts. GLASGOW: 4½d. per lb., carriage paid.

SODIUM BISULPHITE POWDER.—60/62%. £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£27 10s. to £32 per ton, d/d according to quantity.

SODIUM HYPOSULPHITE.—Pea crystals, £15 15s. per ton for 2-ton lots; commercial, £11 15s. per ton. MANCHESTER: Commercial, £12; photographic, £16 10s.

***SODIUM METASILICATE.**—£14 5s. per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 5s. per ton for 6-ton lots d/d.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £16 to £17 per ton delivered for ton lots. Tri-sodium, £18 per ton delivered per ton lots.

SODIUM PRUSSATE.—4½d. to 5½d. per lb.

SODIUM SILICATE.—£8 2s. 6d. per ton.

***SODIUM SULPHATE (GLAUER SALTS).**—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. MANCHESTER: £4.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £13; crystals, £9 15s.

***SODIUM SULPHITE.**—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

***SULPHUR PRECIP.**—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 2½d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. Makers' prices nominal; imported material 2s. 3d. to 2s. 6d. per lb., ex wharf. MANCHESTER: 1s. 5d. per lb.

ZINC OXIDE.—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d buyers' premises.

ZINC SULPHATE.—Tech., about £19 10s., carriage paid, casks free.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 9½d. to 1s. 6d. per lb., according to quality. Crimson, 1s. 7½d. to 1s. 10½d. per lb.

ARSENIC SULPHIDE.—Yellow, 1s. 6d. to 1s. 8d. per lb.

CARBON DISULPHIDE.—£29 to £34 per ton, according to quantity, in free returnable drums.

CARBON TETRACHLORIDE.—£48 to £53 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 1s. 3d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 5½d. to 6½d. per lb.; dark 5½d. to 6d. per lb.

LITHOPONE.—30%, £16 15s. per ton.

SULPHUR CHLORIDE.—6d. to 8d. per lb., according to quantity.

VEGETABLE BLACK.—£35 per ton upwards; 28/30%, £15 10s. 0d.; 60%, £29, delivered buyers' premises.

VERMILION.—Pale or deep, 8s. 5d. per lb., for 7 lb. lots.

ZINC SULPHIDE.—About £63 per ton ex works.

Plus 5% War Charge.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—Per ton in 6-ton lots d/d farmer's nearest station up to January 31, 1940, £9; February, £9 3s.; March/June, £9 6s.

CALCIUM CYANAMIDE.—£12 10s. for 5-ton lots per ton net f.o.r. or ex store, London. Supplies small.

"NITRO-CHALK."—£8 18s. per ton, in 6-ton lots, d/d farmer's nearest station, January/June delivery.

CONCENTRATED COMPLETE FERTILISERS.—£11 18s. to £12 4s. per ton in 6-ton lots, d/d farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£11 14s. to £16 6s. per ton in 6-ton lots, d/d farmer's nearest station.

Coal Tar Products

BENZOL.—Industrial (containing less than 2% of toluol), 2s. to 2s. 1d. per gal., ex works, nominal.

CARBOLIC ACID.—Crystals, 11d. per lb.; Crude, 60's 3s. 3d. to 3s. 6d., according to specification. MANCHESTER: Crystals, 9½d. to 10½d. per lb., d/d; crude, 3s. 6d. to 3s. 9d.; naked, at works.

CREOSOTE.—Home trade, 5d. per gal., f.o.r., makers' works; exports 6d. to 6½d. per gal., according to grade. MANCHESTER: 4½d. to 6½d.

CRESYLIC ACID.—99/100%, 2s. 9d. to 3s. 3d. per gal., according to specification. MANCHESTER: Pale, 99/100%, 3s.

NAPHTHA.—Solvent, 90/160°, 1s. 8d. to 1s. 9d. per gal.; solvent, 95/160°, 2s., naked at works; heavy, 90/190°, 1s. 4d. to 1s. 5d. per gal., naked at works, according to quantity. MANCHESTER: 90/160°, 1s. 6½d. to 1s. 9d. per gal.

NAPHTHALENE.—Crude, whizzed or hot pressed, £8 15s. to £10 15s. per ton; purified crystals, £16 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. MANCHESTER: Refined, £17 to £18.

PITCH.—Medium, soft, 35s. per ton, f.o.b. MANCHESTER: 37s. 6d. to 40s., f.o.b. East Coast.

PYRIDINE.—90/140°, 17s. to 19s. per gal.; 90/160°, 14s. to 16s.; 90/180°, 3s. to 4s. 6d. per gal., f.o.b. MANCHESTER: 17s. to 19s. 6d. per gal.

TOLUOL.—90%, 2s. 3d. per gal.; pure, 2s. 5d., nominal. MANCHESTER: Pure, 2s. 7d. per gal., naked.

XYLOL.—Commercial, 2s. 7d. per gal.; pure, 2s. 9d. MANCHESTER: 2s. 9d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £7 5s. to £8 per ton; grey, £10 to £12. MANCHESTER: Grey, £14.

METHYL ACETONE.—40.50%, £35 to £38 per ton.

WOOD CREOSOTE.—Unrefined, 1s. to 1s. 3d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—3s. 7d. to 4s. per gal.; solvent, 4s. to 4s. 6d. per gal.

WOOD TAR.—£4 to £5 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—1s. 10d. per lb., for cwt. lots, net packages.

BENZIDINE, HCl.—2s. 7d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL 34/35° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 1½d. to 2s. 7d. per lb.

DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROCHLOROBENZENE, SOLID.—£79 5s. per ton.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 11½d.

DIPHENYLAMINE.—Spot, 2s. 3d. per lb.; d/d buyer's works.

GAMMA ACID, Spot, 4s. 4½d. per lb. 100%, d/d buyer's works.

H ACID.—Spot, 2s. 7d. per lb.; 100%, d/d buyer's works.

NAPHTHIONIC ACID.—1s. 10d. per lb.

β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.

α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.

β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.

NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.

o-NITRANILINE.—4s. 3½d. per lb.

m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 10d. to 2s. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5½d. per lb., in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—10d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8½d. per lb. 100%, d/d buyer's works.

o-TOLUIDINE.—11d. per lb., in 8/10 cwt. drums, drums extra.

p-TOLUIDINE.—2s. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—For the period ending February 3, per ton, net, naked, ex works, mills, or refinery, and subject to additional charges, according to package and location of supplies:—**LINSEED OIL, raw, £40 10s. RAPESEED OIL, crude, £44 5s. COTTON-SEED OIL, crude, £26; washed, £28 15s.; refined edible, £29 12s. 6d.; refined deodorised, £30 10s.. SOYA BEAN OIL, crude, £27; refined deodorised, £31. COCONUT OIL, crude, £22 2s. 6d.; refined deodorised, £25 7s. 6d. PALM KERNEL OIL, crude, £21 10s.; refined deodorised, £24 15s. PALM OIL, refined deodorised, £27. GROUNDNUT OIL, crude, £29 10s.; refined deodorised, £34. WHALE OIL, crude, hardened 42 deg., £24 10s.; refined hardened 42 deg., £27. ACID OILS.—Groundnut, £20; soya, £18; coconut and palm kernel, £18 10s. Non-controlled commodities were nominally unaltered. ROSIN, 25s. to 35s. per cwt., ex wharf, according to grade. TURPENTINE, 59s. 6d. per cwt., spot, American, including tax, ex wharf, barrels and ex discount.**

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DIGESTER, 11 ft. high x 5 ft. dia., ½ in. M.S. plate, fitted charging and discharging manholes; almost new. THREE AVAILABLE.

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